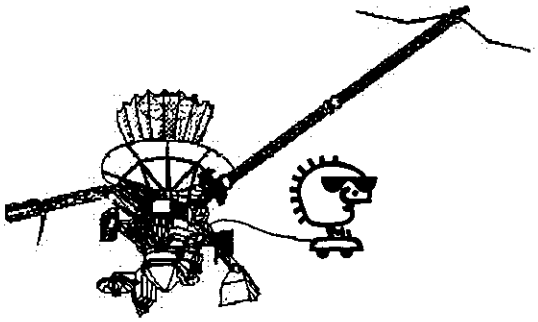
HEY KID want to go to JUPITER?



You want to fly Galileo to Jupiter. Congress says ok, here's $2,500. Go ahead and spend it all, but don't ask for more. You know that it costs $1,000 to design and build the spacecraft and $500 to launch it. You have what's left over to fly the mission. You must examine how much it will cost to keep the mission running and how much to spend on fuel. To get to Jupiter, you have to fly away from the sun. The spacecraft uses fuel for it's engine to speed it towards Jupiter. The speed of the spacecraft must reach 1,000 mph to fly away from the sun's gravity and get to Jupiter. If you go faster than 1,000 mph, Galileo will fly past Jupiter and Galileo won't complete the mission.

Data:

At 1,000 mph, it takes 6 years to get to Jupiter
The mission must last two years once you get there
It costs $50 per year to run the mission after launch
1 pound of fuel costs $1
1 pound of fuel accelerates the spacecraft 1 mph
If you use a Mercury gravity assist, you gain 80 miles per hour and it costs nothing
If you use a Venus gravity assist, you gain 100 miles per hour and it costs nothing
If you use an Earth gravity assist, you gain 150 miles per hour and it costs nothing
If you use a Mars gravity assist, you gain 60 miles per hour and it costs nothing

Questions to answer:

1. Do you need to use gravity assists to get to Jupiter? Why? Explain.

2. If you do use gravity assists, how many do you use? Show your solution.

cost to run mission (after launch) _____ cost for fuel _____